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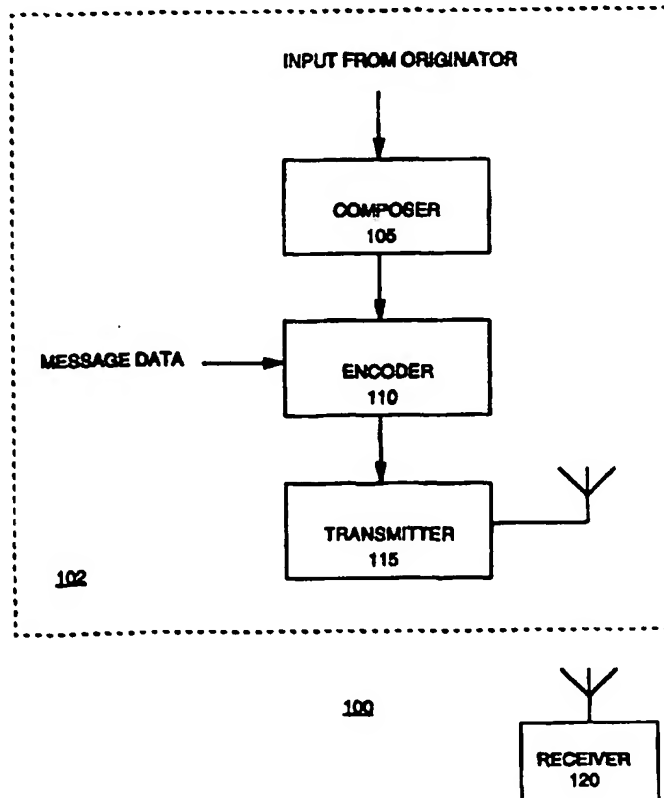
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(54) Title: METHOD AND APPARATUS FOR PROVIDING DEFINABLE AUDIO WITH A PAGE IN A RADIO PAGING COMMUNICATION SYSTEM

(57) Abstract

A paging communication system is disclosed which allows a selective call message originator to compose an audio composition and to then include the audio composition with message data in a selective call message, and a receiver which upon receiving the selective call message displays the message data and concurrently reproduces the audio composition.



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## METHOD AND APPARATUS FOR PROVIDING DEFINABLE AUDIO WITH A PAGE IN A RADIO PAGING COMMUNICATION SYSTEM

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### Field of the Invention

This invention relates in general to paging and in particular to a method and apparatus for providing definable audio tones while presenting a page.

10

### Background of the Invention

Paging provides selective call, one way communication and is well known in the art. Typically, to send a message to a paging receiver, an originator provides a subscriber ID and the message to a radio common carrier (RCC), where the subscriber ID is affiliated with the paging receiver. Subsequently, the RCC transmits the subscriber ID and the message over a radio channel. When the paging receiver receives the subscriber ID and the message, the receiver stores the message in its memory, and produces an alert which notifies a subscriber that the message has been received. When the subscriber initiates a read message function, the paging receiver presents the message to the subscriber.

Alphanumeric paging allows alphanumeric information from an originator to be communicated to an alphanumeric paging subscriber. However, the alphanumeric information is conveyed to the subscriber only after the message is presented on a display and read off the display by the subscriber.

Thus, a need exists for a method and apparatus that will enable an originator of a message to enhance the presentation of the message which blends audio and visual communication to convey information to the subscriber.

### Summary of the Invention

In carrying out the objects of the present invention in one form, there is provided a system for providing a selective call message including definable audio, wherein the system comprises a composer for generating an audio composition in response to input from a selective call message

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originator, a paging encoder for combining the audio composition with message data to form a selective call message, a radio transmitter for transmitting the selective call message, and a receiver for receiving the selective call message and subsequently presenting the message data and reproducing the audio composition.

### Brief Description of the Drawing

FIG. 1 illustrates an embodiment of a paging communication system in accordance with the present invention.

FIG. 2 illustrates an embodiment of a selective call receiver in accordance with the present invention.

FIG. 3 illustrates a flowchart detailing operation of a paging communication system in accordance with a preferred embodiment of the present invention.

FIG. 4 illustrates a flowchart detailing operation of a selective call receiver in accordance with a preferred embodiment of the present invention.

### Detailed Description of the Invention

FIG. 1 illustrates an embodiment of a paging communication system 100 in accordance with the present invention. The system 100 comprises infrastructure 102 and receiver 120. The infrastructure 102 includes a composer 105 which generates an audio composition in response to input from a selective call originator (SCO). For example, the composer 105 may be a software package running on a computer where the SCO provides input i.e. composes an audio composition comprising a sequence of audio tones, via a keyboard and in response, the software generates the audio composition. The composer 105 may also be an electronic musical instrument on which the SCO composes the audio composition. The composer 105 may be integrated into the infrastructure 102, alternatively, the composer 105 may be remotely located from the infrastructure 102. For example, when the composer 105 is integrated with the infrastructure 102

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and the SCO provides input via a public switched telephone network (PSTN) dial up facility coupled to the infrastructure 102, the SCO may compose an audio composition using the composer 105 in addition to providing message data input and a subscriber ID via the dial up facility.

- 5 Alternatively, when the composer 105 is remotely located from the infrastructure 102, the SCO may compose the audio composition at any convenient time using the composer 105, and provide the audio composition when providing the message data and the subscriber ID via the dial up facility. The composer 105 may be a software program running  
10 on a computer where the SCO provides input via a keyboard and in response the software program generates the audio composition.

- The encoder 110 is operably coupled to receive input from the composer 105, and combines the audio composition from the composer 105 with message data to form a selective call message. Typically, after  
15 generating the audio composition, the composer 105 transforms the audio composition into a form usable by the paging encoder 110. Alternatively, the encoder 110 may be enhanced to receive the audio composition from the composer 105 and perform the transformation. The encoder 110, conventionally referred to as a paging encoder, typically supports at least  
20 one paging protocol such as the Post Office Code Standardisation Advisory Group (POCSAG) code or the Golay Sequential Code (GSC) and the selective call message is formed in accordance with the paging protocol supported by the encoder 110. Typically, the output of the encoder 110 is a bit stream which incorporates error correcting features to fortify the  
25 information prior to transmission. A transmitter 115 is coupled to receive the output from the encoder 110 and transmits the output of the encoder 110 on at least one radio channel. Typically, the output of the encoder 110 is modulated on a radio frequency signal for transmission.

- With reference to FIG. 2, the receiver 120 comprises a radio receiver  
30 205 that is tuned to a radio channel. A controller 210 is operably coupled to receive input from the radio receiver 205 and adapted to provide output to a display 215 and an audio generator 220. The controller 210 is also coupled to a memory 212 where the controller 210 may store and retrieve information. For example, the memory may be a semiconductor memory  
35 device or magnetic media. Conventionally, the controller 210 comprises a microcontroller which executes a software program stored in the memory 212. Alternatively, the software program may be stored in a memory within

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the microcontroller. The microcontroller may be coupled via input and output ports to the display 215 and the audio generator 220. For, example, the display 215 typically comprises a liquid crystal display (LCD) that displays numeric or alphanumeric characters. The audio generator 220  
5 may comprise, for example, an audio transducer or a speaker for producing audio in response to input from the controller 210. With this invention, the software program in the semiconductor memory may be enhanced to utilise the audio generator 220 to provide audio alerts as well as to reproduce the audio composition.

10 FIG. 3 illustrates a flowchart detailing the operation of a paging communication system in accordance the preferred embodiment of the present invention. To send a selective call message (SCM), a SCO provides 310 a subscriber ID, the message data, and generates 305 the audio composition typically via the dial up facility on the infrastructure 102.  
15 Subsequently, the subscriber ID, the message data and the audio composition are combined 315 at the encoder 110 to form a selective call message (SCM). The SCM is provided to the transmitter 320 which transmits the SCM on a radio channel.

FIG. 4 illustrates a flowchart detailing operation of a selective call  
20 receiver in accordance with the preferred embodiment of the present invention. The radio receiver 205 receives 405 a SCM on the radio channel. Conventionally, the receiver identifies 410 whether the subscriber ID included in the SCM is affiliated with the receiver 410. When the subscriber ID is not affiliated with the receiver, well known processes in the  
25 art occur, however, when the subscriber ID is affiliated with the receiver 410, the controller 210 stores the SCM in the memory 212. Upon successfully storing the SCM in the memory 212, the controller provides an output to the audio generator 220 causing the audio generator 220 to produce an audio alert. The audio alert informs a subscriber that the SCM  
30 has been received. When the subscriber initiates a read message function, the controller 210 extracts the SCM from the memory 212, and thereby obtains 415 the message data and the audio composition from the SCM. The controller 210 sends the message data to the display 215, which displays the message data, and communicates the audio composition to  
35 the audio generator 220 which reproduces 425 the audio composition. Hence, with this embodiment of the present invention, by enhancing the software program in the receiver, the audio generator may be used to

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provide an audio alert and may also be used to reproduce the audio composition.

Accordingly, the present invention enhances conventional paging infrastructure and receivers to provide a selective call message that  
5 presents information in multimedia, incorporating a visual display and corresponding audio to convey information to a paging subscriber. Concurrent presentation of audio and visual information in accordance with the present invention meets the escalating expectations of paging subscribers who desire more complex information presentation while  
10 advantageously maintaining the small, portable size of the paging receiver. This advantage is realised through dual usage of the audio alert means, such as an audio generator and transducer combination. In addition to the conventional use of the audio transducer for alerting message reception, the present invention uses the audio transducer to enhance message  
15 presentation by providing audio composed by the message originator concurrent with presentation of the visual message on the display of the paging receiver.

Thus, it can be seen that the present invention provides a method and apparatus that will enable an originator of a page to enhance the  
20 presentation of a page by blending audio and visual means to convey information to a paging subscriber.

What is claimed is:

## 6

## CLAIMS

1. A system for providing a selective call message including definable audio, the system comprising:
  - 5 a composer for generating an audio composition in response to input from a selective call message originator;
  - a paging encoder coupled to the composer for combining the audio composition with message data to form a selective call message;
  - 10 a radio transmitter coupled to the paging encoder for transmitting the selective call message; and
  - a receiver for receiving the selective call message, and in response to receiving the selective call message, presenting the message data and concurrently reproducing the audio composition.
2. The system in claim 1 wherein the composer comprises:
  - 20 an audio tone selector for selecting a sequence of audio tones;
  - an audio tone generator coupled to the audio tone selector for producing the selected sequence of audio tones; and
  - 25 an adapter for adapting the selected sequence of audio tones into a form usable by the paging encoder.
3. The system in claim 1 wherein the audio composition comprises a selected sequence of audio tones, and wherein the composer generates the selected sequence of audio tones in response to input from the selective call message originator
4. The system in claim 1 wherein the selective call message comprises a selective call identifier (ID) affiliated with the receiver, the message data and the audio composition, and wherein the paging encoder combines the selective call identifier (ID) affiliated with the receiver, the audio composition and the message data to form the selective call message.



**7.**

5. The system in claim 1 wherein the receiver includes a read message selector, whereupon activating the read message selector by a subscriber, the receiver presents the message data and concurrently  
5 reproduces the audio composition.

6. A receiver for receiving a selective call message including definable audio, the selective call receiver comprising:

10 a radio receiver for receiving a selective call message, wherein the selective call message includes message data and an audio composition;

a display for presenting the message data;

15 an audio generator for reproducing the audio composition; and

a controller operably coupled to receive input from the radio receiver and adapted to provide output to the display and the audio generator, whereupon receiving the selective call message from the radio receiver,  
20 the controller obtains the message data and the audio composition from the selective call message, provides the message data to the display and provides the audio composition to the audio generator, thereby presenting the message data on the display and concurrently reproducing the audio composition via the audio generator.

25

7. The receiver in claim 6 wherein the selective call message comprises a subscriber identifier (ID) affiliated with the receiver, the message data and the audio composition, and wherein the radio receiver receives the subscriber ID affiliated with the receiver, the message data  
30 and the audio composition.

8. The receiver in claim 7 wherein the controller further comprises a subscriber ID verifier, whereupon receiving the selective call message and prior to obtaining the message data and the audio composition, the  
35 subscriber ID verifier verifies the subscriber ID is affiliated with the receiver.

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9. The receiver in claim 6 wherein the audio composition comprises a selected sequence of audio tones, and wherein the audio generator reproduces the selected sequence of audio tones.
- 5 10. The receiver in claim 6 wherein the audio generator generates an audio alert upon receiving the selective call message.
11. The receiver in claim 10 wherein the receiver further comprises a read message selector, whereupon activating the read message selector  
10 by a subscriber subsequent to the audio alert, the receiver presents the message data on the display and concurrently reproduces the audio composition via the audio generator.
12. The receiver in claim 6 wherein the receiver comprises a memory,  
15 whereupon receiving the selective call message from the receiver, the controller obtains the message data and the audio composition and saves the message data and the audio composition in the memory.
13. A method for providing a selective call message including definable  
20 audio, the method comprising the steps of :
- a) generating an audio composition in response to input provided by a selective call message originator;
- 25 b) combining the audio composition with message data to form a selective call message;
- c) transmitting the selective call message; and
- 30 d) upon receiving the selective call message by a selective call receiver, presenting the message data and concurrently reproducing the audio composition.
14. The method of claim 13 step (a) comprises the steps of :  
35 selecting a sequence of audio tones; and

adapting the sequence of audio tones in a format suitable for combining with the message data to form the selective call message.

5 15. The method of claim 14 wherein step (b) further comprises the step of combining a subscriber identifier (ID) affiliated with the selective call receiver, the audio composition and the message data to form the selective call message.

10 16. The method of claim 13 step (d) comprises the steps of:

providing an audio alert upon receiving the selective call message;  
and

obtaining the message data and the audio composition from the selective call message prior to presenting the message data and  
15 concurrently reproducing the audio composition.

17. A method in a selective call receiver for receiving a selective call message including definable audio, the method comprising the steps of :

20 a) receiving a selective call message, wherein the selective call message comprises message data and an audio composition;

b) obtaining the message data and the audio composition from the selective call message;

25

c) presenting the message data; and

d) while displaying the message data, reproducing the audio composition.

30

18. The method of claim 17 wherein the selective call message comprises a subscriber identifier (ID), the message data and the audio composition, and wherein step (a) comprises the step of receiving the subscriber identifier (ID), the message data and the audio composition.

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19. The method of claim 18 wherein step (b) comprises the step of determining whether the subscriber ID is affiliated with the selective call

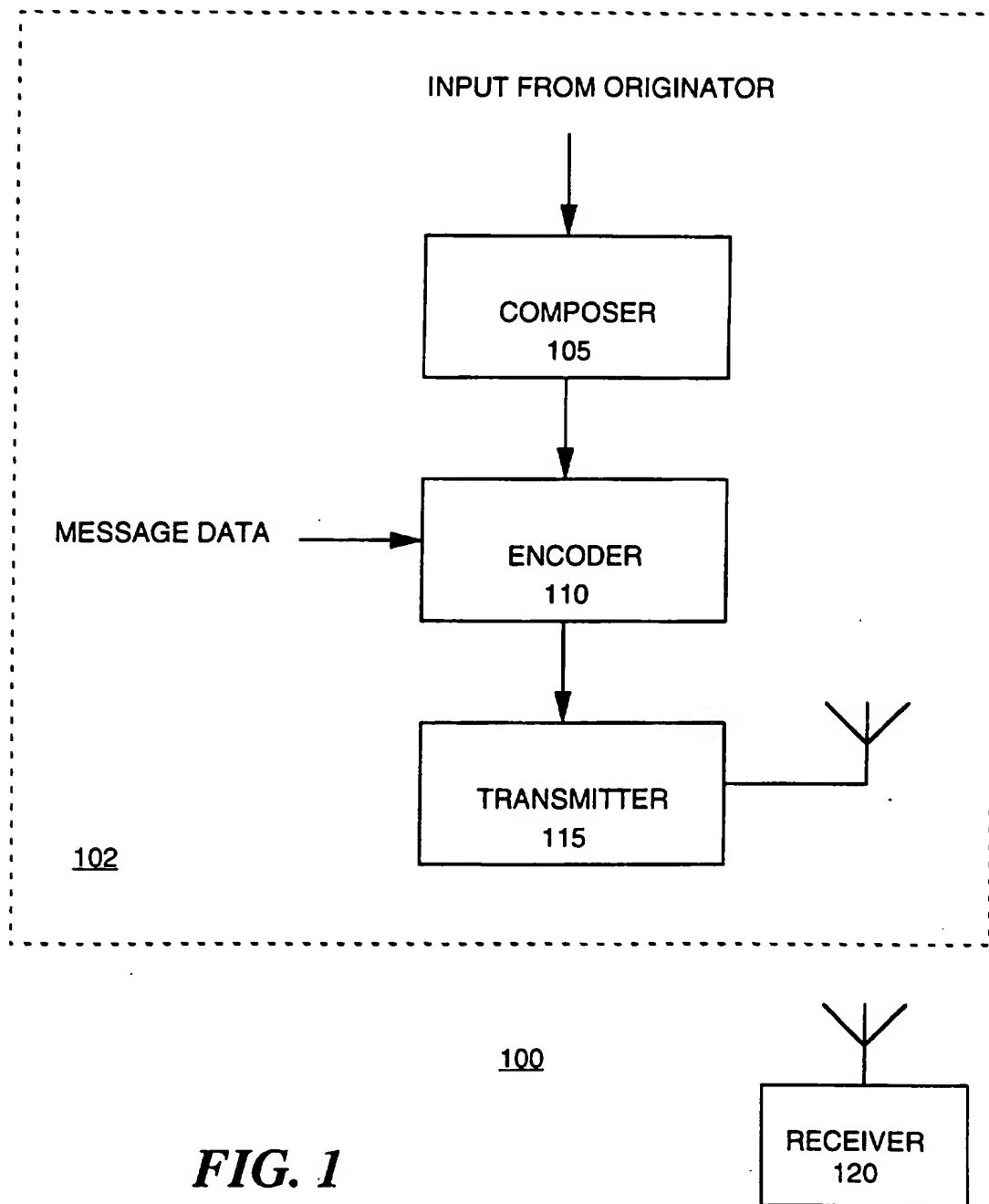
receiver prior to obtaining the message data and the audio composition from the selective call message;

20. The method of claim 17 , after step (b) and prior to step (c) comprises  
5 the steps of:

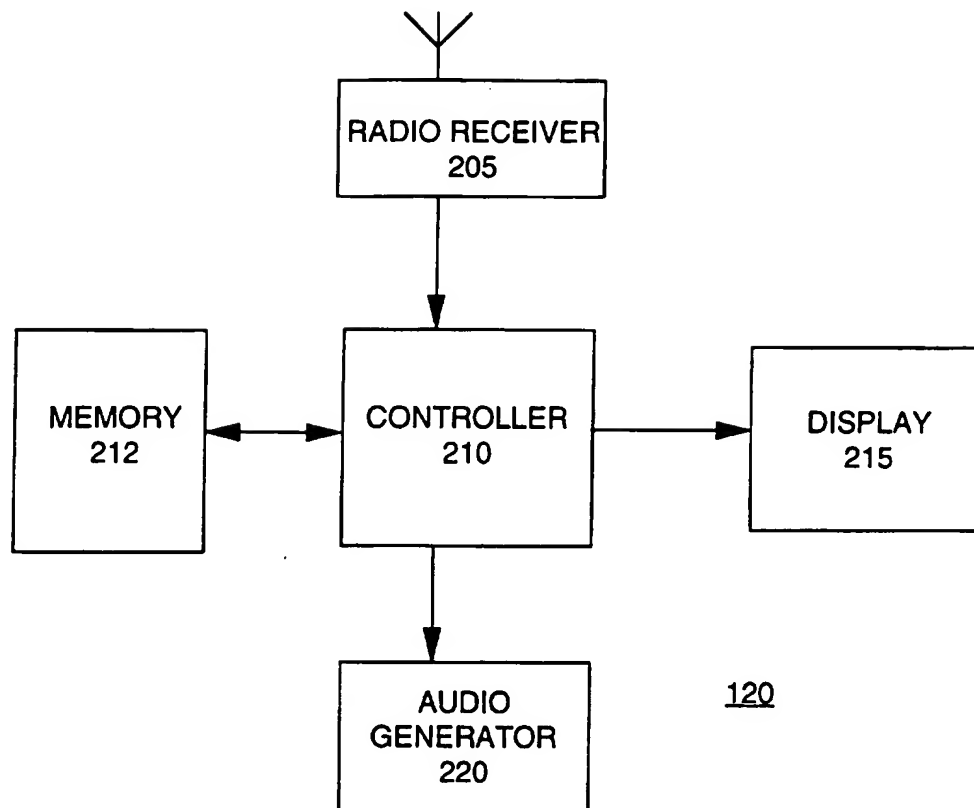
storing the message data and the audio composition in a memory;  
providing an audio alert indicating a message has been received;  
and

10 upon initiating a read message function by a subscriber, obtaining the message data and audio composition from the memory.

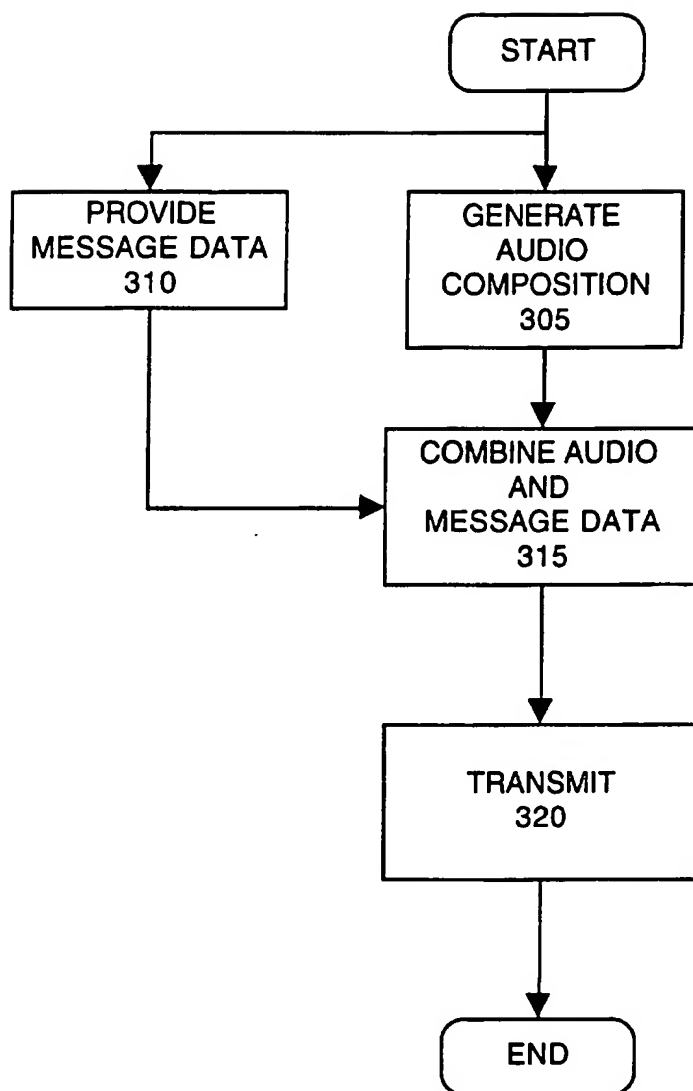
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**FIG. 1**

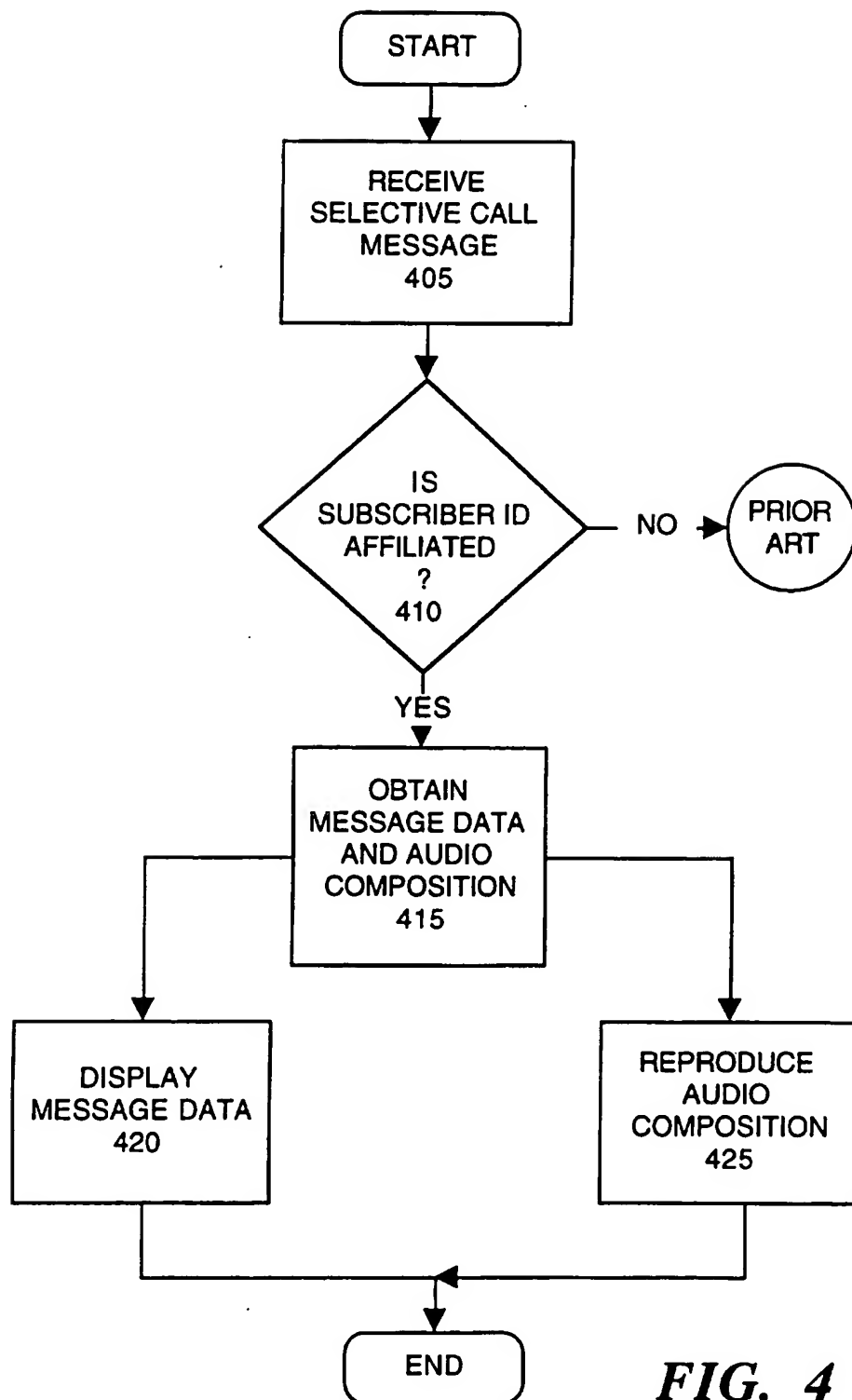
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**FIG. 2**

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**FIG. 3**

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**FIG. 4**